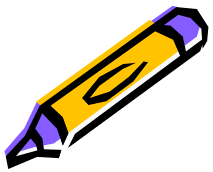
mchview
MUON tracker GUI
for QA

Laurent Aphecetche



Outline

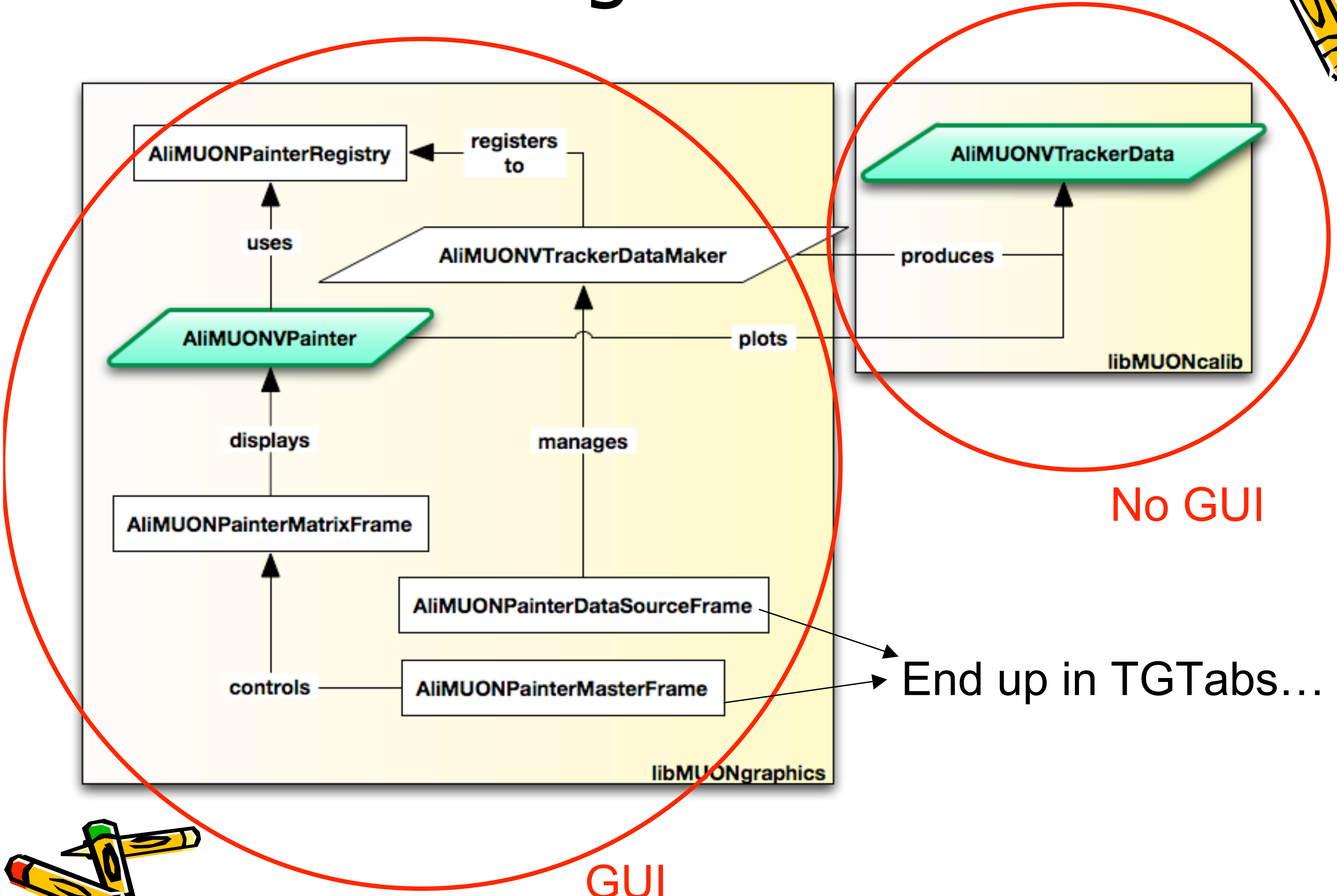
- mchview : a GUI for MUON tracking chambers
- mchview and MCH QA
- request for a change in QA interface

Only RAW data QA is considered in this talk

Yet another GUI ?

- We used Mood extensively at Pt2 since early 2007
  - Nice tool but with some shortcomings
    - Not easy to use offline (due to its deps on DATE…)
    - ***Not*** version controlled
    - Not easy to run on a non-Linux platform
    - MCH incarnation very slow to start, not always as stable/flexible/extensible as we'd like
- EVE's fine for high level 3D (clusters and tracks…), not so for low level 2D (raw data, digits…)
- mchview expected to be the answer to MCH-Mood's shortcomings
  - A standalone 2D app to display data about MUON tracking chambers
  - In ***svn***:MUON package
  - Display and processing well separated so display part can be reused in e.g. … Mood

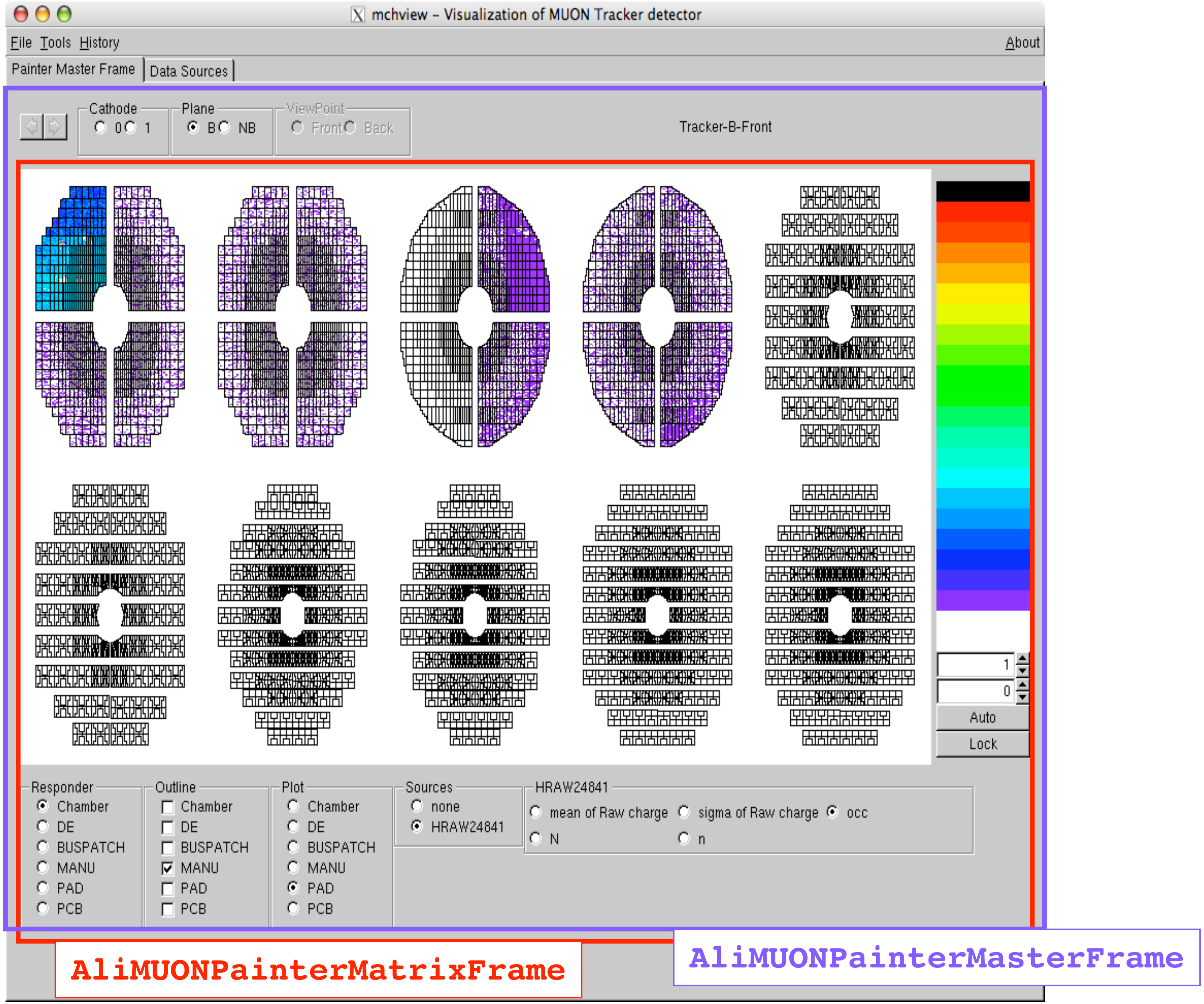
“Design”



No GUI

End up in TGTabs…

GUI



Cathode: ○ 0 ○ 1

Plane: ● B ○ NB

ViewPoint: ○ Front ○ Back

1

0

Responder: ● Chamber ○ DE ○ BUSPATCH ○ MANU ○ PAD ○ PCB

Outline: □ Chamber □ DE □ BUSPATCH ☑ MANU □ PAD □ PCB

Plot: ○ Chamber ○ DE ○ BUSPATCH ○ MANU ● PAD ○ PCB

Sources: ○ none ● HRAW24841

HRAW24841: ○ mean of Raw charge ○ sigma of Raw charge ● occ ○ N ○ n

AliMUONPainterMatrixFrame

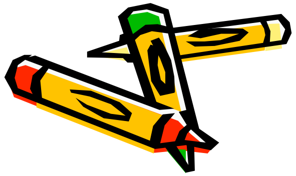
AliMUONPainterMasterFrame

This is not a talk about mchview …

- More info about that program can be found :
  - in MUON code documentation
    - http://aliceinfo.cern.ch/static/Offline/dimuon/muon_html/README_mchview.html
  - in last MUON online-offline meeting's presentation
    - http://indico.cern.ch/conferenceDisplay.py?confId=30483
    - there's even a "draft" screencast there :
      - http://indico.cern.ch/materialDisplay.py?contribId=18&sessionId=5&materialId=0&confId=30483

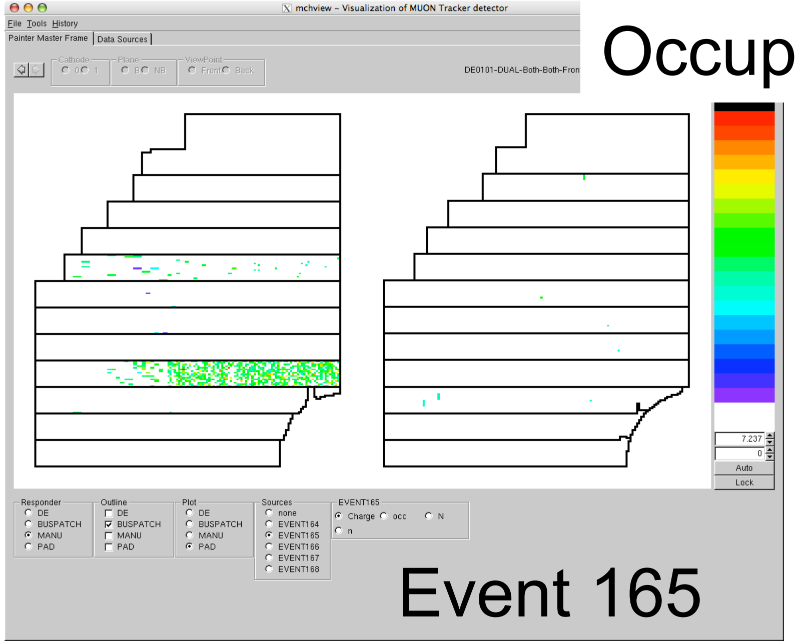
… but about QA

- Our first line of defense to wasting storage with garbage data !
  - Must be ***robust***
  - Must be ***easy to interpret*** by the larger audience possible
  - Must allow further investigations, if needed (by ***experts***)
- Surface commissioning, cavern installation, cosmic run data analysis, etc…
  - Gave _some_ idea on what can go wrong
  - But new things keep happening as we approach final configuration ;-)



A use case : run 24841

- Started with one of Peter's mail : your reco is hanging for that run. Could you please have a look ?
- Launched mchview, and a few clicks later(*), a misbehaving detection element was isolated



DE0101-DUAL-Both-Both-Front

Responder: ○ DE ○ BUSPATCH ● MANU ○ PAD

Outline: □ DE ☑ BUSPATCH □ MANU □ PAD

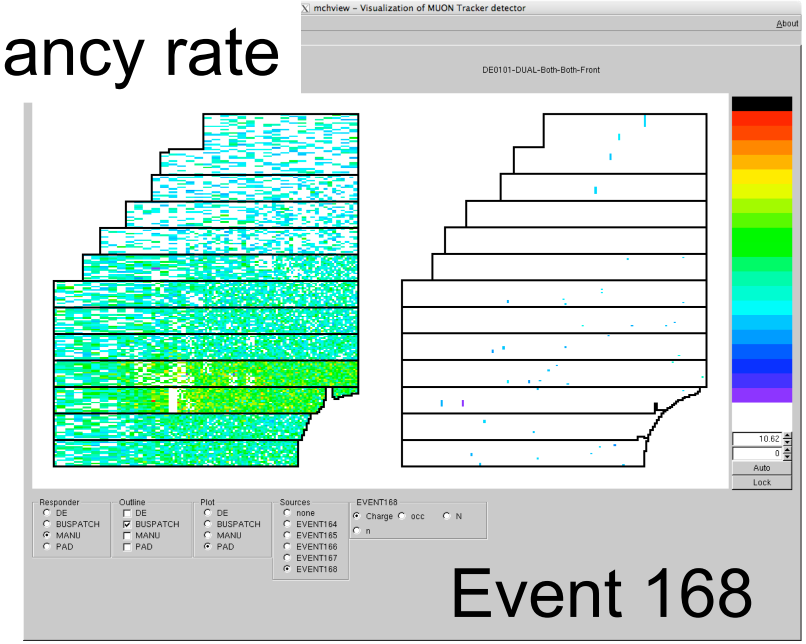
Plot: ○ DE ○ BUSPATCH ○ MANU ● PAD

Sources: ○ none ○ EVENT164 ● EVENT165 ○ EVENT166 ○ EVENT167 ○ EVENT168

EVENT165: ● Charge ○ occ ○ N ○ n

Event 165

Occupancy rate



DE0101-DUAL-Both-Both-Front

Responder: ○ DE ○ BUSPATCH ● MANU ○ PAD

Outline: □ DE ☑ BUSPATCH □ MANU □ PAD

Plot: ○ DE ○ BUSPATCH ○ MANU ● PAD

Sources: ○ none ○ EVENT164 ○ EVENT165 ○ EVENT166 ○ EVENT167 ● EVENT168

EVENT168: ● Charge ○ occ ○ N ○ n

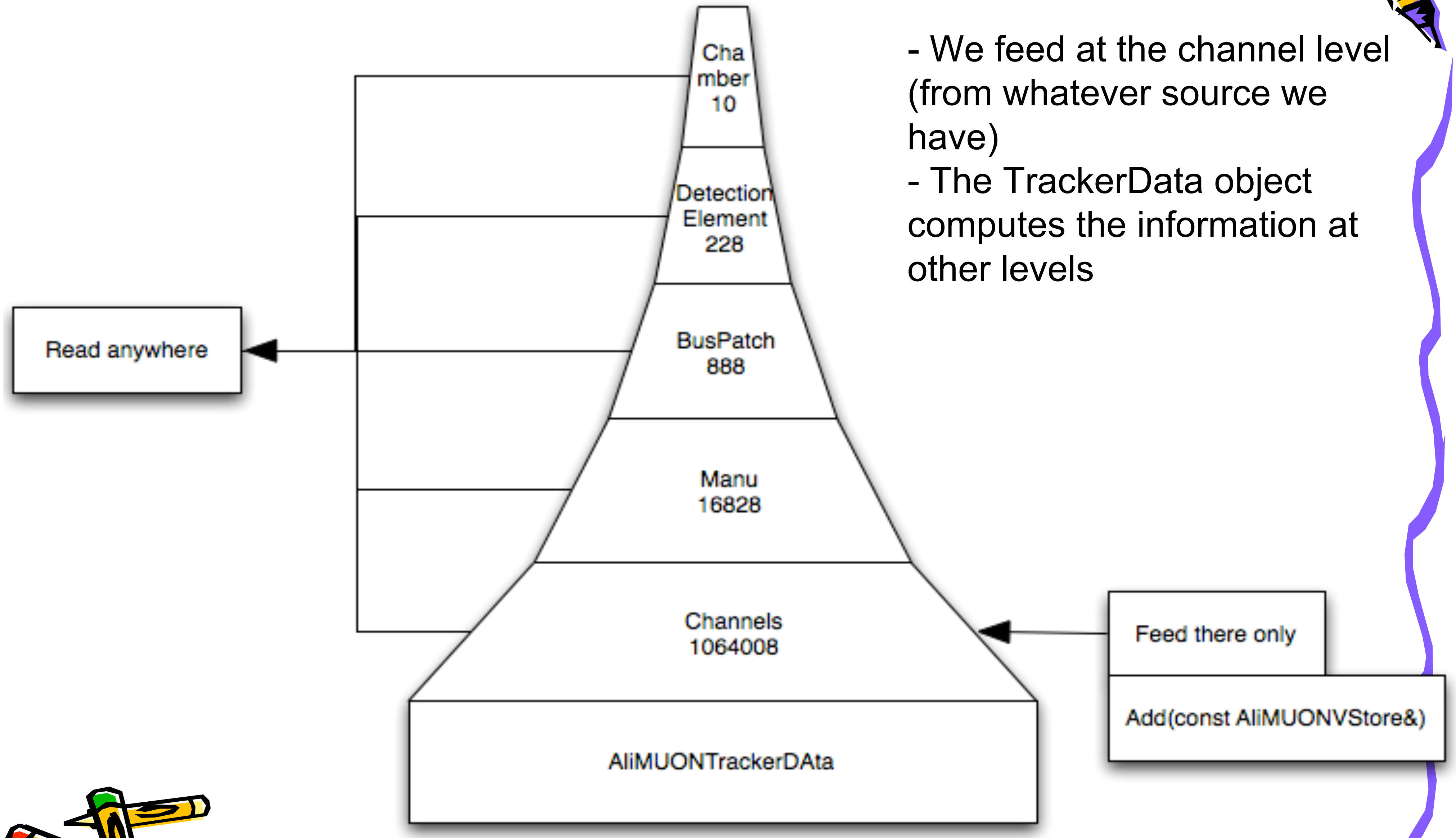
Event 168

(*) Complete story at https://twiki.cern.ch/twiki/bin/view/ALICE/MuonRunNumber24841

A use case : run 24841 (2)

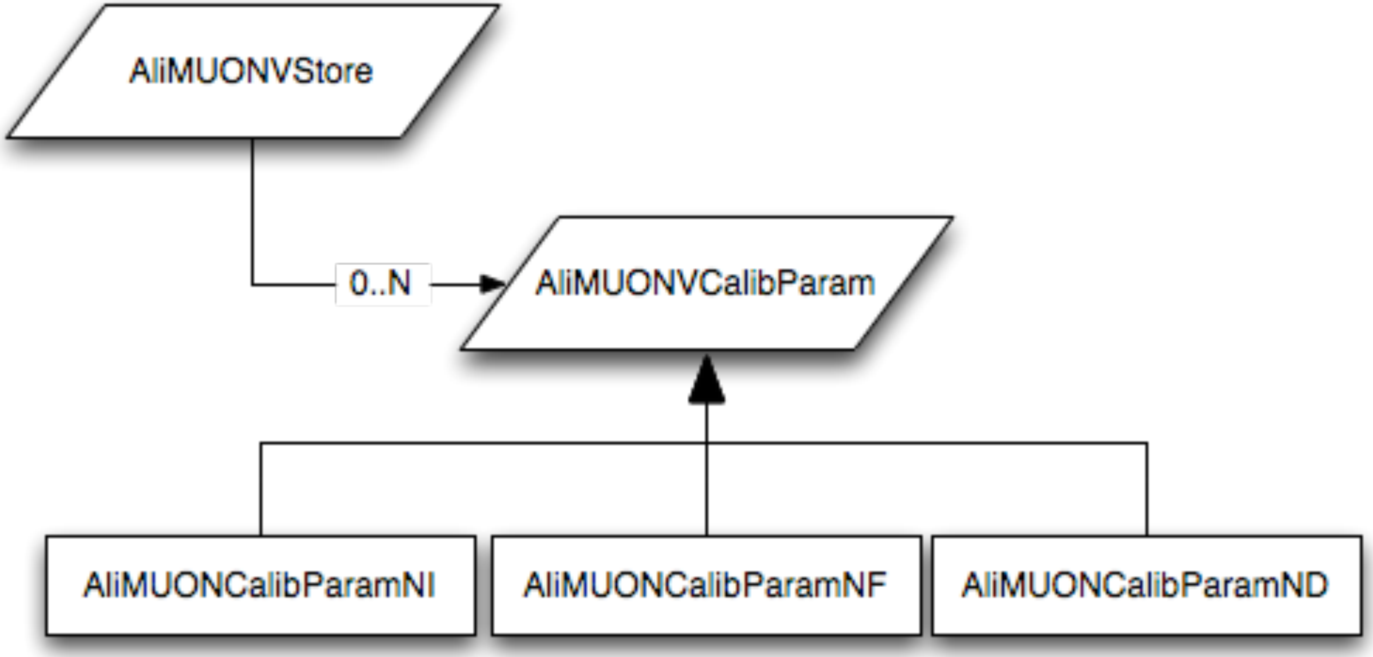
- Safety belts (and air-bag) added to the reco
- But this should have been detected online… by some QA
- We do have the building block to do this : `AliMUON(V)TrackerData` class

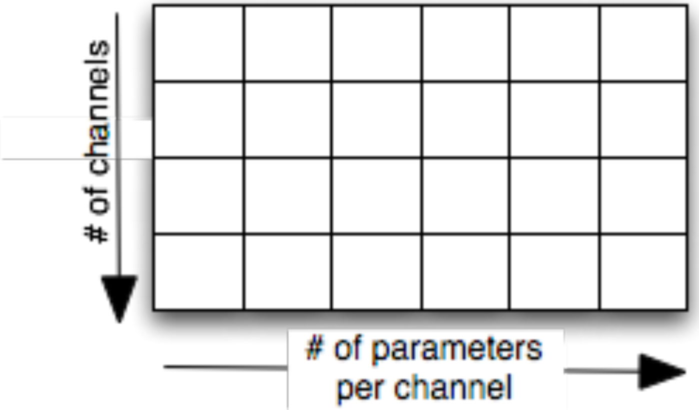
AliMUONTrackerData



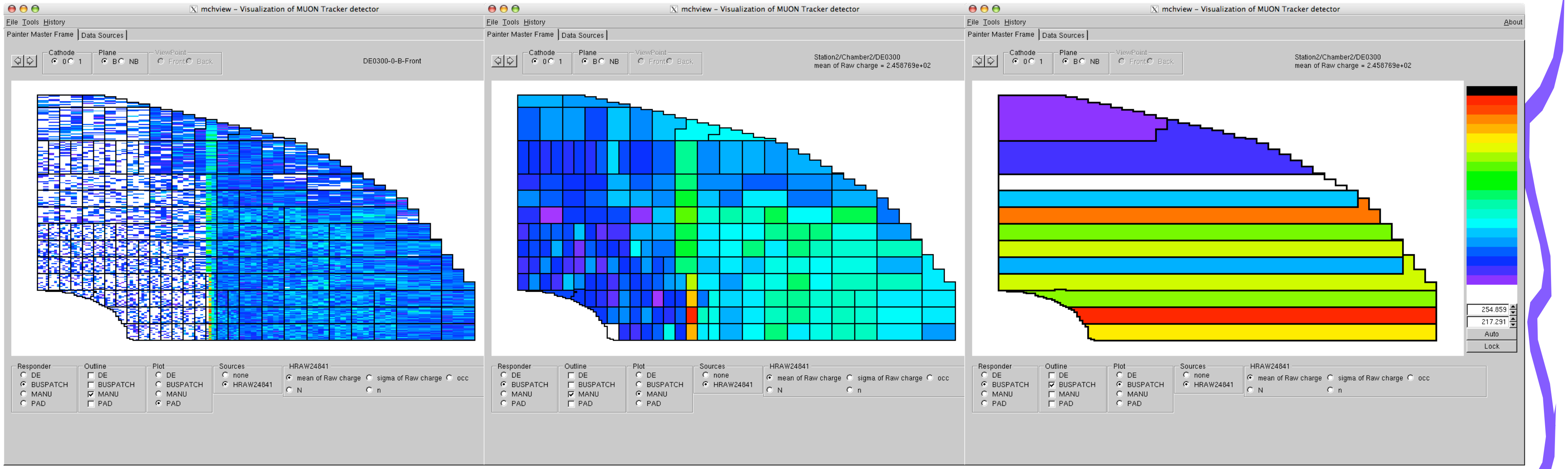
- We feed at the channel level (from whatever source we have)
- The TrackerData object computes the information at other levels

() : AliMUONVStore





Escalation exemple



mchview – Visualization of MUON Tracker detector

File Tools History

Painter Master Frame | Data Sources

Cathode: ● 0 ○ 1 — Plane: ● B ○ NB — ViewPoint: ○ Front ○ Back

DE0300-0-B-Front

Responder: ○ DE ● BUSPATCH ○ MANU ○ PAD

Outline: □ DE □ BUSPATCH ☑ MANU □ PAD

Plot: ○ DE ○ BUSPATCH ○ MANU ● PAD

Sources: ○ none ● HRAW24841

HRAW24841: ● mean of Raw charge ○ sigma of Raw charge ○ occ ○ N ○ n

mchview – Visualization of MUON Tracker detector

File Tools History

Painter Master Frame | Data Sources

Cathode: ● 0 ○ 1 — Plane: ● B ○ NB — ViewPoint: ○ Front ○ Back

Station2/Chamber2/DE0300
mean of Raw charge = 2.458769e+02

Responder: ○ DE ● BUSPATCH ○ MANU ○ PAD

Outline: □ DE □ BUSPATCH ☑ MANU □ PAD

Plot: ○ DE ○ BUSPATCH ● MANU ○ PAD

Sources: ○ none ● HRAW24841

HRAW24841: ● mean of Raw charge ○ sigma of Raw charge ○ occ ○ N ○ n

mchview – Visualization of MUON Tracker detector

File Tools History — About

Painter Master Frame | Data Sources

Cathode: ● 0 ○ 1 — Plane: ● B ○ NB — ViewPoint: ○ Front ○ Back

Station2/Chamber2/DE0300
mean of Raw charge = 2.458769e+02

254.859
217.291
Auto
Lock

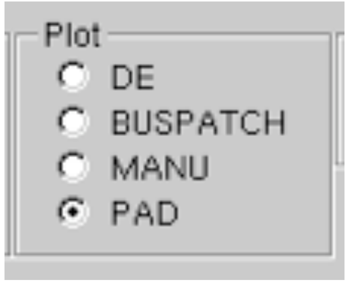
Responder: ○ DE ● BUSPATCH ○ MANU ○ PAD

Outline: □ DE ☑ BUSPATCH □ MANU □ PAD

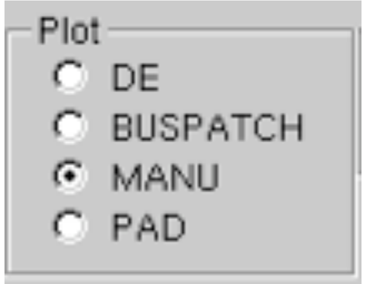
Plot: ○ DE ● BUSPATCH ○ MANU ○ PAD

Sources: ○ none ● HRAW24841

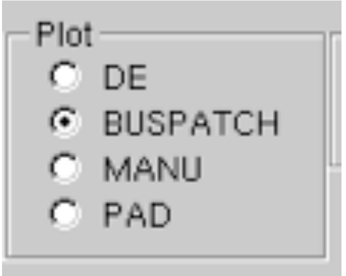
HRAW24841: ● mean of Raw charge ○ sigma of Raw charge ○ occ ○ N ○ n



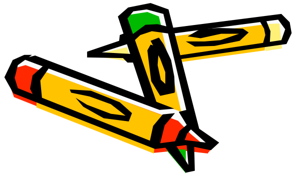
Plot
○ DE
○ BUSPATCH
○ MANU
● PAD



Plot
○ DE
○ BUSPATCH
● MANU
○ PAD



Plot
○ DE
● BUSPATCH
○ MANU
○ PAD



AliMUONTrackerData is persistent

- Can be saved, and re-read in mchview
- Can be compared
  - Used e.g. in Pt2 to compare (big) noise levels between runs
- Disk space cost = f(occupancy)
  - Complete MCH pedestal run ~ 10 MB
  - Feb 08 data "typical" run ~ 1 MB (or 3 MB w/ histogramming turned on)

AliMUONTrackerData (almost) fits the bill

- Why not reusing it as is for DQM ?
- Because only TH1 object supported by the framework (offline QA)
  - Why not Tobject instead of TH1 ?
  - Tobject::Merge exist, after all…

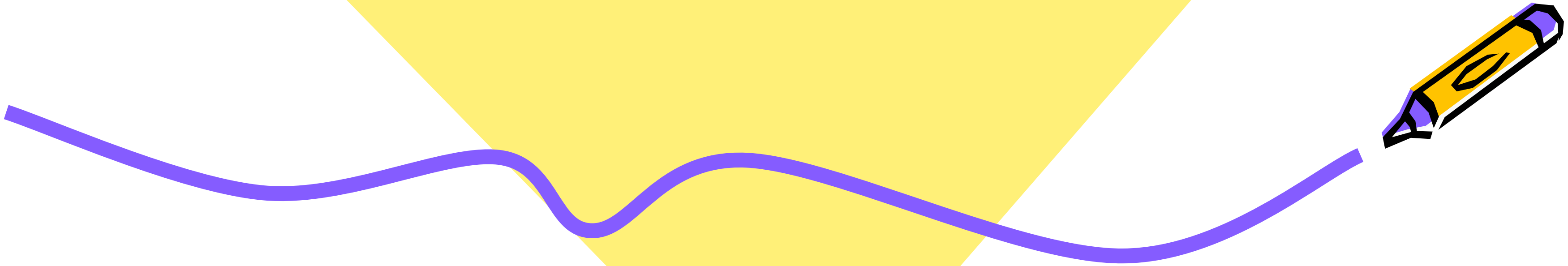
The request then is to change AliQA* interface(s) to allow Tobject* as QA data object.

YES ?

MUON QA Status

source	Definition of monitored objects	Code implementation	Code in SVN	Warnings	Comparison with ref. data
Online - raw	🟨🟩	🟧	🟥	🟥	🟥
Online - RecP	🟨🟩	🟧	🟥	🟥	🟥
Offline - raw	🟨🟩	🟨🟩	🟩	🟥	🟥
Offline - RecPoints	🟨🟩	🟨🟩	🟩	🟥	🟥
Offline - ESD	🟨🟩	🟨🟩	🟩	🟥	🟥
Offline - Digits	🟨🟩	🟨🟩	🟩	🟥	🟥

BACKUP



Save the Memory !

- TH1(2,3) memory hogs for sparse data…
  - Plotting pad occupancy using a TH2 :
    - St 1 ~ 180cm*180cm pad size 0.21 cm => 860*860 bins ~7E5 bins, for only ~ 1E5 pads. Factor 7 waste !
  - Even Root object, like THnSparse cannot be used, as do not derive from TH1 !